NOTICE

All drawings located at the end of the document.

Draft Data Summary Report For IHSS Group 400-4

PAC 400-803 – Miscellaneous Dumping, Building 446 Storm Drain and PAC 400-804 – Road North of Building 460

Approval received from the Colorado Department of Public Health and Environment

( ).

Approval letter contained in the Administrative Record.

August 2004

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ENCLOSURE

Compact Disc Containing Standardized Real and Quality Control Data

ACRONYMS

AAESE	Accelerated Action Ecological Screening Evaluation
AL	action level
AR	Administrative Record
ASD	Analytical Services Division
CAS	Chemical Abstract Service
CD	compact disc
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	contaminant of concern
CRA	Comprehensive Risk Assessment
DOE	U.S. Department of Energy
DQA	Data Quality Assessment
DQO	data quality objective
EB	equipment blank
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
FB	field blank
ft	Foot or feet
FY	Fiscal Year
HPGe	high-purity germanium
HRR	Historical Release Report
IA	Industrial Area
IASAP	Industrial Area Sampling and Analysis Plan
IHSS	Individual Hazardous Substance Site
IM/IRA	Interim Measure/Interim Remedial Action
IMP	Integrated Monitoring Program
K-H	Kaiser-Hill Company, L.L.C.
LCS	laboratory control sample
ug/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
MS	matrix spike
MSD	matrix spike duplicate
NA	not applicable
NFAA	No Further Accelerated Action
OPWL	Original Process Waste Line
PAC	Potential Area of Concern
PAH	polyaromatic hydrocarbon
PARCCS	precision, accuracy, representativeness, completeness, comparability, and sensitivity
pCi/g	picocuries per gram
QC	quality control
RFCA	Rocky Flats Cleanup Agreement
RFETS or Site	Rocky Flats Environmental Technology Site

ACRONYMS

RIN	report identification number
RL	reporting limit
RNS	rinse blank
RPD	relative percent difference
SAP	Sampling and Analysis Plan
SBD	sample beginning depth
SID	South Interceptor Ditch
SED	sample ending depth
SOR	sum of ratios
SSRS	Subsurface Soil Risk Screen
SVOC	semivolatile organic compound
SWD	Soil Water Database
TB	trip blank
UBC	Under Building Contamination
V&V	verification and validation
WRW	wildlife refuge worker
XRF	x-ray fluorescence

1.0 INTRODUCTION

This Data Summary Report summarizes accelerated action characterization conducted at Individual Hazardous Substance Site (IHSS) Group 400-4 at the Rocky Flats Environmental Technology Site (RFETS or Site) in Golden, Colorado. These activities were planned and executed in accordance with the Industrial Area (IA) Sampling and Analysis Plan (SAP) (IASAP) (DOE 2001) and IASAP Addendum #IA-04-14 (DOE 2004). Results are compared to wildlife refuge worker (WRW) action levels (ALs) described in the Rocky Flats Cleanup Agreement (RFCA) (DOE et al. 2003). Potential ecological risk associated with the results will be evaluated in the Accelerated Action Ecological Screening Evaluation (AAESE) and the ecological portion of the Sitewide Comprehensive Risk Assessment (CRA). The location of IHSS Group 400-4 is shown on Figure 1.

This IHSS Group consists of two Potential Areas of Concern (PACs):

- PAC 400-803 – Miscellaneous Dumping, Building 446 Storm Drain; and
- PAC 400-804 – Road North of Building 460.

Approval of this Data Summary Report constitutes regulatory agency concurrence that IHSS Group 400-4 is a No Further Accelerated Action (NFAA) Site. This information and NFAA determination will be documented in the Fiscal Year (FY) 2004 (04) Historical Release Report (HRR).

2.0 SITE CHARACTERIZATION

IHSS Group 400-4 information consists of historical knowledge (DOE 1992), historical sampling data, and recent sampling data. Historical information and data are summarized in Section 2.1. Characterization data collected in accordance with IASAP Addendum #IA-04-14 (DOE 2004) are presented in Section 2.2.

2.1 Historical Information and Data

PAC 400-803 consists of a reported release to the storm drain west of Building 446. A roofing contractor at Building 444 had reportedly dumped miscellaneous materials into the storm drain, which consisted of silver paint, aluminum paint, and possibly other materials including oil (DOE 1992). The material flowed along a historic open ditch south of Cottonwood Avenue to a point south of the former fuel oil storage tanks, passed beneath the street, and ran northeastward to the extent of Seventh Avenue.

PAC 400-804 consists of a reported release of four ingots, which fell from a truck, damaging the road north of Building 446 (DOE 1992). After removal of the ingots, the area was dry-vacuumed. Photographs were taken of the release area.

Historical information and data for this IHSS are available in Appendix C of the IASAP (DOE 2001) and the HRR (DOE 1992).

2.2 Accelerated Action Characterization Data

Accelerated action characterization of IHSS Group 400-4 included eight sampling locations. Sampling and analysis specifications for these locations were described in IASAP Addendum #IA-04-14 (DOE 2004). A summary of planned and actual sampling and analysis, as well as additional sampling and analysis, is presented in Table 1. Deviations from the IASAP Addendum specifications are summarized in Table 2.

Table 1
IHSS Group 400-4 Sampling and Analysis Summary

IHSS Group	Category	Planned Total	Actual Total
400-4	Number of Sampling Locations	8	8
	Number of Samples	8	8
	Number of Metal Analyses	6	6
	Number of Radionuclide Analyses	8	8
	Number of SVOC Analyses	6	6

Based on the location of subsurface storm drains associated with the miscellaneous dumping in this area and likelihood of contamination (PAC 400-803), biased sampling locations were used for characterization of PAC 400-803. Surface sampling location BX37-024 was placed within the drain as the point of entry, as specified in IASAP Addendum #IA-04-14 (DOE 2004). Sampling locations BY37-030, BZ37-022, CA38-023, CA38-025, and CB38-012 were field-located to target the drainage ditch and associated outfalls and culverts based on current Site conditions. Sampling location BY37-030 was the only subsurface sampling location, which targeted the outfall from the storm drain to a historic ditch located in this area, which has since been filled and covered with asphalt.

On April 13, 2004, excavation of Original Process Waste Line (OPWL) P-4, located on the northern side of Cottonwood Avenue (north of PAC 400-803) began. Samples from locations CA38-023, CA38-025, and CB38-012 were collected on April 14, 2004 to characterize the storm sewer outfalls and open ditch in this area before further soil disturbance occurred because of the excavation activities.

Sampling locations BX37-023 and BY38-024 (PAC 400-804) were located in the field based on review of incident photographs to target the actual location of the ingot release. Based on historic photographs of the spill area, the shape and size of PAC 400-804 will be adjusted to reflect the actual spill area. This change will be documented in the FY04 HRR.

Accelerated action soil sampling locations and analytical results for IHSS Group 400-4 are summarized in Table 3, and shown on Figures 2 and 3. Only results greater than background means plus two standard deviations or reporting limits (RLs) are presented. Data indicate that all contaminant activities and concentrations are less than RFCA WRW ALs except for benzo(a)pyrene and dibenz(a,h)anthracene. Benzo(a)pyrene was detected at PAC 400-803 surface soil sampling location BX37-024 at a concentration of 9,200 micrograms per kilogram (ug/kg). Benzo(a)pyrene and dibenz(a,h)anthracene

Table 2
IHSS Group 400-4 Characterization Sampling Deviations

IHSS/PAC/UBC Site	Location	Proposed Northing	Proposed Easting	Actual Northing	Actual Easting	Media	Actual Depth (ft)	Actual Analyte	Comments
PAC 400-803	BX37-024	748946.836	2082288.850	748947.612	2082288.241	Surface soil	0.0 - 0.5	Metals Radionuclides SVOCs	No deviations from the planned specifications.
	BY37-030	748954.475	2082408.208	748953.707	2082409.598	Subsurface soil	0.5 - 2.5	Metals Radionuclides SVOCs	Field-located to target drainage ditch.
	BZ37-022	748950.746	2082654.353	748944.751	2082647.783	Surface soil	0.0 - 0.5	Metals Radionuclides SVOCs	Original location east of drainage ditch; moved to mouth of culvert to characterize drainage to culvert.
	CA38-023	748998.399	2082800.656	748997.190	2082790.825	Surface soil	0.0 - 0.5	Metals Radionuclides SVOCs	Field-located to target drainage ditch.
	CA38-025	748997.805	2082763.030	748997.864	2082782.128	Surface soil	0.0 - 0.5	Metals Radionuclides SVOCs	Field-located to target drainage ditch outfall.
	CB38-012	749026.451	2083022.752	749030.072	2083022.348	Surface soil	0.0 - 0.5	Metals Radionuclides SVOCs	Field-located to target drainage ditch.
PAC 400-804	BX37-023	748959.182	2082335.362	748975.547	2082314.431	Surface soil	0.6 - 1.1	Radionuclides	Field-located to target location of ingot impact on the road. Sample collected beneath asphalt road.
	BY38-024	748982.644	2082362.666	748981.321	2082319.326	Surface soil	0.0 - 0.5	Radionuclides	Field-located to target location of ingot impact on the road. Sample collected beneath asphalt road.

Table 3
IHSS Group 400-4 Results Greater Than Background Means Plus Two Standard Deviations or Reporting Limits

IHSS, PAC, or UBC Site	Location Code	Easting	Northing	Start Depth (ft)	End Depth (ft)	Analyte	Result	WRW AL	Background Mean Plus Two Standard Deviations	Reporting Limit	Units
PAC 400-803	BX37-024	748947.612	2082288.241	0.0	0.5	Acenaphthene	950.000	40800000	-	35.000	ug/kg
	BX37-024	748947.612	2082288.241	0.0	0.5	Anthracene	5100.000	204000000	-	27.000	ug/kg
	BX37-024	748947.612	2082288.241	0.0	0.5	Antimony	0.490	409	0.470	-	mg/kg
	BX37-024	748947.612	2082288.241	0.0	0.5	Benzo(a)anthracene	9400.000	34900	-	110.000	ug/kg
	BX37-024	**748947.612**	**2082288.241**	**0.0**	**0.5**	**Benzo(a)pyrene**	**9200.000**	**3490**	**-**	**180.000**	**ug/kg**
	BX37-024	748947.612	2082288.241	0.0	0.5	Benzo(b)fluoranthene	8300.000	34900	-	130.000	ug/kg
	BX37-024	748947.612	2082288.241	0.0	0.5	Benzo(k)fluoranthene	6900.000	349000	-	150.000	ug/kg
	BX37-024	748947.612	2082288.241	0.0	0.5	bis(2-Ethylhexyl)phthalate	230.000	1970000	-	82.000	ug/kg
	BX37-024	748947.612	2082288.241	0.0	0.5	Chrysene	10000.000	3490000	-	130.000	ug/kg
	BX37-024	748947.612	2082288.241	0.0	0.5	Copper	32.000	40900	18.060	-	mg/kg
	BX37-024	748947.612	2082288.241	0.0	0.5	Dibenz(a,h)anthracene	2800.000	3490	-	28.000	ug/kg
	BX37-024	748947.612	2082288.241	0.0	0.5	Dibenzofuran	410.000	2950000	-	41.000	ug/kg
	BX37-024	748947.612	2082288.241	0.0	0.5	Fluoranthene	18000.000	27200000	-	100.000	ug/kg
	BX37-024	748947.612	2082288.241	0.0	0.5	Fluorene	1200.000	40800000	-	39.000	ug/kg
	BX37-024	748947.612	2082288.241	0.0	0.5	Indeno(1,2,3-cd)pyrene	6200.000	34900	-	26.000	ug/kg
	BX37-024	748947.612	2082288.241	0.0	0.5	Pyrene	17000.000	22100000	-	610.000	ug/kg
	BX37-024	*748947.612*	*2082288.241*	*0.0*	*0.5*	*Uranium-234*	*3.951*	*300*	*2.253*	-	*pCi/g*
	BX37-024	748947.612	2082288.241	0.0	0.5	Uranium-235	0.203	8	0.094	-	pCi/g
	BX37-024	748947.612	2082288.241	0.0	0.5	Uranium-238	3.951	351	2.000	-	pCi/g
	BX37-024	748947.612	2082288.241	0.0	0.5	Zinc	220.000	307000	73.760	-	mg/kg
	BY37-030	748953.707	2082409.598	0.5	2.5	2-Methylnaphthalene	45.000	20400000	-	34.000	ug/kg
	BY37-030	748953.707	2082409.598	0.5	2.5	Acenaphthene	2500.000	40800000	-	33.000	ug/kg
	BY37-030	748953.707	2082409.598	0.5	2.5	Anthracene	13000.000	204000000	-	250.000	ug/kg
	BY37-030	748953.707	2082409.598	0.5	2.5	Benzo(a)anthracene	33000.000	34900	-	270.000	ug/kg
	BY37-030	**748953.707**	**2082409.598**	**0.5**	**2.5**	**Benzo(a)pyrene**	**35000.000**	**3490**	**-**	**430.000**	**ug/kg**

IHSS, PAC, or UBC Site	Location Code	Easting	Northing	Start Depth (ft)	End Depth (ft)	Analyte	Result	WRW AL	Background Mean Plus Two Standard Deviations	Reporting Limit	Units
	BY37-030	748953.707	2082409.598	0.5	2.5	Benzo(b)fluoranthene	29000.000	34900	-	310.000	ug/kg
	BY37-030	748953.707	2082409.598	0.5	2.5	Benzo(k)fluoranthene	29000.000	349000	-	340.000	ug/kg
	BY37-030	748953.707	2082409.598	0.5	2.5	Chrysene	36000.000	3490000	-	300.000	ug/kg
	BY37-030	**748953.707**	**2082409.598**	**0.5**	**2.5**	**Dibenz(a,h)anthracene**	**10000.000**	**3490**	**-**	**270.000**	**ug/kg**
	BY37-030	748953.707	2082409.598	0.5	2.5	Dibenzofuran	1000.000	2950000	-	39.000	ug/kg
	BY37-030	748953.707	2082409.598	0.5	2.5	Fluoranthene	66000.000	27200000	-	240.000	ug/kg
	BY37-030	748953.707	2082409.598	0.5	2.5	Fluorene	3500.000	40800000	-	37.000	ug/kg
	BY37-030	748953.707	2082409.598	0.5	2.5	Indeno(1,2,3-cd)pyrene	20000.000	34900	-	240.000	ug/kg
	BY37-030	748953.707	2082409.598	0.5	2.5	Naphthalene	55.000	3090000	-	34.000	ug/kg
	BY37-030	748953.707	2082409.598	0.5	2.5	Plutonium-239/240	0.267	50	0.020	-	pCi/g
	BY37-030	748953.707	2082409.598	0.5	2.5	Pyrene	67000.000	22100000	-	1400.000	ug/kg
	BY37-030	748953.707	2082409.598	0.5	2.5	Zinc	150.000	307000	139.100	-	mg/kg
	BZ37-022	748944.751	2082647.783	0.0	0.5	Acenaphthene	140.000	40800000	-	49.000	ug/kg
	BZ37-022	748944.751	2082647.783	0.0	0.5	Anthracene	200.000	204000000	-	37.000	ug/kg
	BZ37-022	748944.751	2082647.783	0.0	0.5	Benzo(a)anthracene	490.000	34900	-	39.000	ug/kg
	BZ37-022	748944.751	2082647.783	0.0	0.5	Benzo(a)pyrene	570.000	3490	-	63.000	ug/kg
	BZ37-022	748944.751	2082647.783	0.0	0.5	Benzo(b)fluoranthene	480.000	34900	-	45.000	ug/kg
	BZ37-022	748944.751	2082647.783	0.0	0.5	Benzo(k)fluoranthene	470.000	349000	-	50.000	ug/kg
	BZ37-022	748944.751	2082647.783	0.0	0.5	bis(2-Ethylhexyl)phthalate	240.000	1970000	-	110.000	ug/kg
	BZ37-022	748944.751	2082647.783	0.0	0.5	Chrysene	630.000	3490000	-	44.000	ug/kg
	BZ37-022	748944.751	2082647.783	0.0	0.5	Fluoranthene	1000.000	27200000	-	36.000	ug/kg
	BZ37-022	748944.751	2082647.783	0.0	0.5	Fluorene	110.000	40800000	-	53.000	ug/kg
	BZ37-022	748944.751	2082647.783	0.0	0.5	Indeno(1,2,3-cd)pyrene	340.000	34900	-	36.000	ug/kg
	BZ37-022	748944.751	2082647.783	0.0	0.5	Naphthalene	59.000	3090000	-	50.000	ug/kg
	BZ37-022	748944.751	2082647.783	0.0	0.5	Pyrene	1100.000	22100000	-	210.000	ug/kg
	BZ37-022	*748944.751*	*2082647.783*	*0.0*	*0.5*	*Uranium-234*	*10.570*	*300*	*2.253*	-	*pCi/g*
	BZ37-022	748944.751	2082647.783	0.0	0.5	Uranium-235	0.651	8	0.094	-	pCi/g

IHSS, PAC, or UBC Site	Location Code	Easting	Northing	Start Depth (ft)	End Depth (ft)	Analyte	Result	WRW AL	Background Mean Plus Two Standard Deviations	Reporting Limit	Units
	BZ37-022	748944.751	2082647.783	0.0	0.5	Uranium-238	10.570	351	2.000	-	pCi/g
	BZ37-022	748944.751	2082647.783	0.0	0.5	Zinc	390.000	307000	73.760	-	mg/kg
	CA38-023	748997.190	2082790.825	0.0	0.5	Benzo(b)fluoranthene	47.000	34900	-	34.000	ug/kg
	CA38-023	748997.190	2082790.825	0.0	0.5	Chrysene	47.000	3490000	-	33.000	ug/kg
	CA38-023	748997.190	2082790.825	0.0	0.5	Fluoranthene	48.000	27200000	-	27.000	ug/kg
	CA38-023	748997.190	2082790.825	0.0	0.5	Lead	58.000	1000	54.620	-	mg/kg
	CA38-023	748997.190	2082790.825	0.0	0.5	Zinc	300.000	307000	73.760	-	mg/kg
	CA38-025	748997.864	2082782.128	0.0	0.5	Zinc	380.000	307000	73.760	-	mg/kg
	CB38-012	749030.072	2083022.348	0.0	0.5	Benzo(a)anthracene	42.000	34900	-	30.000	ug/kg
	CB38-012	749030.072	2083022.348	0.0	0.5	Benzo(a)pyrene	48.000	3490	-	48.000	ug/kg
	CB38-012	749030.072	2083022.348	0.0	0.5	Benzo(b)fluoranthene	50.000	34900	-	34.000	ug/kg
	CB38-012	749030.072	2083022.348	0.0	0.5	Benzo(k)fluoranthene	49.000	349000	-	38.000	ug/kg
	CB38-012	749030.072	2083022.348	0.0	0.5	bis(2-Ethylhexyl)phthalate	94.000	1970000	-	86.000	ug/kg
	CB38-012	749030.072	2083022.348	0.0	0.5	Chrysene	57.000	3490000	-	33.000	ug/kg
	CB38-012	749030.072	2083022.348	0.0	0.5	Fluoranthene	71.000	27200000	-	27.000	ug/kg
	CB38-012	*749030.072*	*2083022.348*	*0.0*	*0.5*	*Uranium-234*	*2.309*	*300*	*2.253*	-	*pCi/g*
	CB38-012	749030.072	2083022.348	0.0	0.5	Uranium-238	2.309	351	2.000	-	pCi/g
PAC 400-804	*BX37-023*	*748975.547*	*2082314.431*	*0.6*	*1.1*	*Uranium-234*	*5.048*	*300*	*2.253*	-	*pCi/g*
	BX37-023	748975.547	2082314.431	0.6	1.1	Uranium-235	0.297	8	0.094	-	pCi/g
	BX37-023	748975.547	2082314.431	0.6	1.1	Uranium-238	5.048	351	2.000	-	pCi/g
	BY38-024	*748981.321*	*2082319.326*	*0.0*	*0.5*	*Uranium-234*	*4.217*	*300*	*2.253*	-	*pCi/g*
	BY38-024	748981.321	2082319.326	0.0	0.5	Uranium-235	0.277	8	0.094	-	pCi/g
	BY38-024	748981.321	2082319.326	0.0	0.5	Uranium-238	4.217	351	2.000	-	pCi/g

Italic type denotes values derived from high-purity germanium (HPGe) measurements.
Bold type denotes WRW AL exceedance.

were detected at PAC 400-803 subsurface soil sampling location BY37-030 at concentrations of 35,000 ug/kg and 10,000 ug/kg, respectively. For all other sampling locations at IHSS Group 400-4, concentrations of semivolatile organic compounds (SVOCs), including benzo(a)pyrene and dibenz(a,h)anthracene, were below the associated RFCA WRW ALs. All radionuclides detected at the two locations targeting PAC 400-804 were well below the associated RFCA WRW ALs.

No action was taken to remove soil with the elevated benzo(a)pyrene and dibenz(a,h)anthracene concentrations because these contaminants of concern (COCs) are not located within an area prone to landslides or erosion. Additionally, these COCs were not detected in surface water or groundwater monitoring stations near IHSS Group 400-4. The exceedance of these COCs appears to be most likely due to asphaltic materials mixed in with the soil throughout the area. In accordance with the IASAP (2001), the surface soil exceedance of benzo(a)pyrene is less than three times the AL. Also in accordance with the IASAP, the results of the elevated measurement comparison are less than 1.

The project data, retrieved from the RFETS Soil Water Database (SWD), are provided on the enclosed compact disc (CD). The CD contains standardized real and quality control (QC) data, including Chemical Abstract Service (CAS) numbers, analyte names, and units.

2.3 Sum of Ratios

RFCA sums of ratios (SORs) were calculated for the IHSS Group 400-4 surface soil sampling locations to 3 feet (ft). SOR calculations were based on accelerated action analytical data for the radionuclides of concern (americium-241, plutonium-239/240, uranium-234, uranium-235, and uranium-238) with activities greater than background means plus two standard deviations. Table 4 presents the SORs. All radionuclide SORs are less than 1.

Table 4
RFCA SORs Based on IHSS Group 400-4 Radionuclide Activities

Location	Start Depth (ft)	End Depth (ft)	SOR
BX37-023	0.6	1.1	0.068
BX37-024	0.0	0.5	0.050
BY37-030	0.5	2.5	0.002
BY38-024	0.0	0.5	0.061
BZ37-022	0.0	0.5	0.147
CB38-012	0.0	0.5	0.014

SORs for nonradionuclides were not calculated because the only analytes detected at 10 percent or greater than the associated RFCA WRW ALs were polyaromatic hydrocarbons (PAHs) which are not required to be reported. Subsurface soil SORs for nonradionuclides were not calculated because subsurface soil concentrations are evaluated as part of the Subsurface Soil Risk Screen (SSRS) in Section 3.0.

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2.4 Summary Statistics

Summary statistics for analytes detected above background means plus two standard deviations or RLs were calculated by analyte for the IHSS Group 400-4 sampling locations. These data are presented in Tables 5 and 6 for surface and subsurface soil, respectively.

Table 5
Surface Soil Summary Statistics

Analyte	Number of Samples	Detection Frequency	Mean Concentration	Maximum Concentration	WRW AL	Background Mean Plus Two Standard Deviations	Unit
Acenaphthene	5	40.00%	545.000	950.000	40800000	-	ug/kg
Anthracene	5	40.00%	2650.000	5100.000	204000000	-	ug/kg
Antimony	5	20.00%	0.490	0.490	409	0.470	mg/kg
Benzo(a)anthracene	5	60.00%	3310.667	9400.000	34900	-	ug/kg
Benzo(a)pyrene	**5**	**60.00%**	**3272.667**	**9200.000**	**3490**	**-**	**ug/kg**
Benzo(b)fluoranthene	5	80.00%	2219.250	8300.000	34900	-	ug/kg
Benzo(k)fluoranthene	5	60.00%	2473.000	6900.000	349000	-	ug/kg
bis(2-Ethylhexyl)phthalate	5	60.00%	188.000	240.000	1970000	-	ug/kg
Chrysene	5	80.00%	2683.500	10000.000	3490000	-	ug/kg
Copper	5	20.00%	32.000	32.000	40900	18.060	mg/kg
Dibenz(a,h)anthracene	5	20.00%	2800.000	2800.000	3490	-	ug/kg
Dibenzofuran	5	20.00%	410.000	410.000	2950000	-	ug/kg
Fluoranthene	5	80.00%	4779.750	18000.000	27200000	-	ug/kg
Fluorene	5	40.00%	655.000	1200.000	40800000	-	ug/kg
Indeno(1,2,3-cd)pyrene	5	40.00%	3270.000	6200.000	34900	-	ug/kg
Lead	5	20.00%	58.000	58.000	1000	54.620	mg/kg
Naphthalene	5	20.00%	59.000	59.000	3090000	-	ug/kg
Pyrene	5	40.00%	9050.000	17000.000	22100000	-	ug/kg
Uranium-234	7	71.43%	5.219	10.570	300	2.253	pCi/g
Uranium-235	7	57.14%	0.357	0.651	8	0.094	pCi/g
Uranium-238	7	71.43%	5.219	10.570	351	2.000	pCi/g
Zinc	5	80.00%	322.500	390.000	307000	73.760	mg/kg

Table 6
Subsurface Soil Summary Statistics

Analyte	Number of Samples	Detection Frequency	Mean Concentration	Maximum Concentration	WRW AL	Background Mean Plus Two Standard Deviations	Unit
2-Methylnaphthalene	1	100.00%	45.000	45.000	20400000	-	ug/kg
Acenaphthene	1	100.00%	2500.000	2500.000	40800000	-	ug/kg
Anthracene	1	100.00%	13000.000	13000.000	204000000	-	ug/kg
Benzo(a)anthracene	1	100.00%	33000.000	33000.000	34900	-	ug/kg

Analyte	Number of Samples	Detection Frequency	Mean Concentration	Maximum Concentration	WRW AL	Background Mean Plus Two Standard Deviations	Unit
Benzo(a)pyrene	**1**	**100.00%**	**35000.000**	**35000.000**	**3490**	**-**	**ug/kg**
Benzo(b)fluoranthene	1	100.00%	29000.000	29000.000	34900	-	ug/kg
Benzo(k)fluoranthene	1	100.00%	29000.000	29000.000	349000	-	ug/kg
Chrysene	1	100.00%	36000.000	36000.000	3490000	-	ug/kg
Dibenz(a,h)anthracene	**1**	**100.00%**	**10000.000**	**10000.000**	**3490**	**-**	**ug/kg**
Dibenzofuran	1	100.00%	1000.000	1000.000	2950000	-	ug/kg
Fluoranthene	1	100.00%	66000.000	66000.000	27200000	-	ug/kg
Fluorene	1	100.00%	3500.000	3500.000	40800000	-	ug/kg
Indeno(1,2,3-cd)pyrene	1	100.00%	20000.000	20000.000	34900	-	ug/kg
Naphthalene	1	100.00%	55.000	55.000	3090000	-	ug/kg
Plutonium-239/240	1	100.00%	0.267	0.267	50	0.020	pCi/g
Pyrene	1	100.00%	67000.000	67000.000	22100000	-	ug/kg
Zinc	1	100.00%	150.000	150.000	307000	139.100	mg/kg

3.0 SUBSURFACE SOIL RISK SCREEN

The SSRS follows the steps identified on Figure 3 in Attachment 5 of RFCA (DOE et al. 2003).

Screen 1 – Are the COC concentrations below RFCA Table 3 WRW soil ALs?

No. All subsurface COC concentrations are less than the WRW ALs, except for detections of benzo(a)pyrene and dibenz(a,h)anthracene. These two COCs were detected at subsurface sampling location BY37-030 at concentrations of 35,000 ug/kg and 10,000 ug/kg, respectively.

Screen 2 – Is there a potential for subsurface soil to become surface soil (landslide and erosion areas identified on Figure 1)?

No. Based upon Figure 1 of RFCA Attachment 5 (DOE et al. 2003), IHSS Group 400-4 is not located in an area considered prone to landslides or erosion.

Screen 3 – Does subsurface soil radiological contamination exceed criteria in Section 5.3 and Attachment 14?

No. All radiological activities in this IHSS Group were below criteria specified in Section 5.3 and Attachment 14.

Screen 4 – Is there an environmental pathway and sufficient quantity of COCs that would cause an exceedance of the surface water standard?

No. Contaminant migration via erosion and groundwater are the two possible pathways whereby surface water could become contaminated by IHSS Group 400-4 COCs. However, migration via erosion is unlikely because IHSS Group 400-4 is not located in an area prone to landslides or erosion.

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Surface water runoff from PACs 400-803 and 400-804 flows to the ditch located on the southern side of Cottonwood Avenue. The ditch crosses beneath Cottonwood Avenue and continues toward Seventh Avenue. Gaging station GS57 is located within the ditch, at a point just after the ditch passes beneath Cottonwood Avenue. This location is a Performance Monitoring Location, which is part of the Integrated Monitoring Program (IMP) (DOE 2003). Two gaging stations not considered part of the IMP are located downgradient of PACs 400-803 and 400-804. Gaging station GS29 is located along Seventh Avenue, and gaging station GS30 is located near the intersection of Central Avenue and Seventh Avenue, within the Central Avenue Ditch. Surface water data in SWD shows concentrations of metals (aluminum, copper, lead, and zinc) in exceedance of the associated surface water ALs. These gaging stations reflect surface water conditions in this area of the IA. Surface water quality at these locations may not be attributed to any single upgradient IHSS Group.

Groundwater flows to the southeast in this area toward the South Interceptor Ditch (SID), located approximately 1,200 ft to the south. Three groundwater monitoring wells are located within 25 ft of IHSS Group 400-4. Groundwater data, retrieved from SWD, were reviewed for these wells. No Tier I groundwater AL exceedances were found. Tier II exceedances included 1,2-dichloroethene, tetrachloroethene, trichloroethene, vinyl chloride, nitrate, antimony, mercury, and thallium. None of these analytes were detected in IHSS Group 400-4 soil. These wells reflect groundwater conditions in this area of the IA. Groundwater quality at these locations may not be attributed to any single upgradient IHSS Group. Monitoring wells surrounding the area will continue to be sampled as part of the IMP (DOE 2003). Further groundwater evaluation will be part of the groundwater Interim Measure/Interim Remedial Action (IM/IRA).

No concentrations of benzo(a)pyrene or dibenz(a,h)anthracene were detected in surface water or groundwater monitoring locations near IHSS Group 400-4.

4.0 NFAA SUMMARY

Based on analytical results and the SSRS, action is not required, and an NFAA determination is justified for IHSS Group 400-4 based on the following:

- Concentrations of COCs were not detected above RFCA WRW ALs except for benzo(a)pyrene and dibenz(a,h)anthracene.
- Migration of contaminants to surface water through erosion is unlikely because the area is not prone to landslides or erosion.
- Migration of contaminants in groundwater will not likely impact surface water because of the low levels of soil contamination found in IHSS Group 400-4. Groundwater will be further evaluated in a future decision document.

Approval of this Data Summary Report constitutes regulatory agency concurrence that IHSS Group 400-4 is an NFAA Site. This information and the NFAA determination will be documented in the FY04 HRR. Ecological factors will be evaluated in the AAESE and the CRA.

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5.0 DATA QUALITY ASSESSMENT

The data quality objectives (DQOs) for this project are described in the IASAP (DOE 2001). All DQOs for this project were achieved based on the following:

- Regulatory agency-approved sampling program design (IASAP Addendum #IA-04-14-04 [DOE 2004]), modified due to field conditions, in accordance with the IASAP (DOE 2001);
- Collection of samples in accordance with the sampling design; and
- Results of the Data Quality Assessment (DQA), as described in the following sections.

5.1 Data Quality Assessment Process

The DQA process ensures that the type, quantity, and quality of environmental data used in decision making are defensible, and is based on the following guidance and requirements:

- U.S. Environmental Protection Agency (EPA) QA/G-4, 1994a, Guidance for the Data Quality Objective Process;
- EPA QA/G-9, 1998, Guidance for the Data Quality Assessment Process, Practical Methods for Data Analysis; and
- U.S. Department of Energy (DOE) Order 414.1A, 1999, Quality Assurance.

Verification and validation (V&V) of data are the primary components of the DQA. The final data are compared with original project DQOs and evaluated with respect to project decisions; uncertainty within the decisions; and quality criteria required for the data, specifically precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS). Validation criteria are consistent with the following RFETS-specific documents and industry guidelines:

- EPA 540/R-94/012, 1994b, USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review;
- EPA 540/R-94/013, 1994c, USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review;
- Kaiser-Hill Company, L.L.C. (K-H) V&V Guidelines:
  - General Guidelines for Data Verification and Validation, DA-GR01-v1, 2002a
  - V&V Guidelines for Isotopic Determinations by Alpha Spectrometry, DA-RC01-v1, 2002b
  - V&V Guidelines for Volatile Organics, DA-SS01-v1, 2002c

  - V&V Guidelines for Semivolatile Organics, DA-SS02-v1, 2002d
  - V&V Guidelines for Metals, DA-SS05-v1, 2002e; and

- Lockheed-Martin, 1997, Evaluation of Radiochemical Data Usability, ES/ER/MS-5.

This report will be submitted to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Administrative Record (AR) for permanent storage 30 days after being provided to the Colorado Department of Public Health and Environment (CDPHE) and/or EPA.

5.2 Verification and Validation of Results

Verification ensures that data produced and used by the project are documented and traceable in accordance with quality requirements. Validation consists of a technical review of all data that directly support the project decisions so that any limitations of the data relative to project goals are delineated and the associated data are qualified accordingly. The V&V process defines the criteria that constitute data quality, namely PARCCS parameters. Data traceability and archival are also addressed. V&V criteria include the following:

- Chain-of-custody;
- Preservation and hold times;
- Instrument calibrations;
- Preparation blanks;
- Interference check samples (metals);
- Matrix spikes/matrix spike duplicates (MS/MSDs);
- Laboratory control samples (LCSs);
- Field duplicate measurements;
- Chemical yield (radiochemistry);
- Required quantitation limits/minimum detectable activities (sensitivity of chemical and radiochemical measurements, respectively); and
- Sample analysis and preparation methods.

Evaluation of V&V criteria ensures that PARCCS parameters are satisfactory (i.e., within tolerances acceptable to the project). Satisfactory V&V of laboratory quality controls are captured through application of validation "flags" or qualifiers to individual records.

Raw hard-copy data (for example, individual analytical data packages) are currently filed by report identification number (RIN) and maintained by K-H Analytical Services

Division (ASD); older hard copies may reside in the Federal Center in Lakewood, Colorado. Electronic data are stored in the RFETS SWD.

Both real and QC data are included on the enclosed CD.

5.2.1 Accuracy

The following measures of accuracy were evaluated:

- LCSs;
- Surrogates;
- Field blanks; and
- Sample MSs.

Results are compared to method requirements and project goals. The results of these comparisons are summarized for RFCA COCs where the result could impact project decisions. Particular attention is paid to those values near WRW ALs when QC results could indicate unacceptable levels of uncertainty for decision-making purposes.

Laboratory Control Sample Evaluation

The frequency of LCS measurements is presented in Table 7. As indicated in Table 7 LCSs were run for all methods except gamma spectroscopy and SW-846 6020 (metals by x-ray fluorescence [XRF]). The on-site laboratories are not required to provide these data.

The minimum and maximum LCS results are tabulated by chemical for the entire project in Table 8. While not all LCS results are within tolerances, project decisions based on WRW AL exceedances were not affected. LCS results that were outside of tolerances were reviewed to determine whether a potential bias might be indicated. LCS recoveries are not indicative of matrix effects because they are not prepared using Site samples. LCS results do indicate whether the laboratory may be introducing a bias in the results. Recoveries reported above the upper limit may indicate the actual sample results are less than reported. Because this is environmentally conservative, no further action is needed. The analytes with unacceptable low recoveries were evaluated. If the highest sample result divided by the lowest LCS recovery for that analyte is less than the AL, no further action is taken because any indicated bias is not great enough to make a falsely low sample result be above the WRW AL. As a result of these analyses, the LCS recoveries for this project did not impact project decisions. Any qualifications of individual results due to LCS performance exceeding upper or lower tolerance limits are captured in the V&V flags, described in Section 5.2.3.

Table 7
LCS Frequency

Test Method	Lab Batch	Laboratory Control Standards
ALPHA SPEC	4117265	Yes
ALPHA SPEC	4117267	Yes
ALPHA SPEC	4117272	Yes

Test Method	Lab Batch	Laboratory Control Standards
ALPHA SPEC	4152043	Yes
ALPHA SPEC	4152044	Yes
ALPHA SPEC	4152045	Yes
SW-846 6010	4118156	Yes
SW-846 6010	4119291	Yes
SW-846 6010	4140573	Yes
SW-846 6010	4141296	Yes
SW-846 8270	4110547	Yes
SW-846 8270	4140556	Yes

Table 8
LCS Evaluation Summary

Test Method	CAS No.	Analyte	Minimum (%REC)	Maximum (%REC)
SW-846 8270	120-82-1	1,2,4-Trichlorobenzene	66	71
SW-846 8270	95-95-4	2,4,5-Trichlorophenol	65	69
SW-846 8270	88-06-2	2,4,6-Trichlorophenol	67	77
SW-846 8270	120-83-2	2,4-Dichlorophenol	67	77
SW-846 8270	105-67-9	2,4-Dimethylphenol	67	73
SW-846 8270	51-28-5	2,4-Dinitrophenol	40	45
SW-846 8270	121-14-2	2,4-Dinitrotoluene	68	70
SW-846 8270	606-20-2	2,6-Dinitrotoluene	69	69
SW-846 8270	91-58-7	2-Chloronaphthalene	65	70
SW-846 8270	95-57-8	2-Chlorophenol	69	74
SW-846 8270	91-57-6	2-Methylnaphthalene	68	77
SW-846 8270	95-48-7	2-Methylphenol	68	71
SW-846 8270	88-74-4	2-Nitroaniline	69	78
SW-846 8270	91-94-1	3,3'-Dichlorobenzidine	63	65
SW-846 8270	534-52-1	4,6-Dinitro-2-methylphenol	50	60
SW-846 8270	106-47-8	4-Chloroaniline	55	66
SW-846 8270	106-44-5	4-Methylphenol	69	74
SW-846 8270	100-02-7	4-Nitrophenol	73	84
SW-846 8270	83-32-9	Acenaphthene	65	70
SW-846 6010	7429-90-5	Aluminum	95	102
SW-846 8270	120-12-7	Anthracene	63	75
SW-846 6010	7440-36-0	Antimony	91	97
SW-846 6010	7440-38-2	Arsenic	92	98
SW-846 6010	7440-39-3	Barium	99	100
SW-846 8270	56-55-3	Benzo(a)anthracene	63	70
SW-846 8270	50-32-8	Benzo(a)pyrene	64	71
SW-846 8270	205-99-2	Benzo(b)fluoranthene	59	67

Test Method	CAS No.	Analyte	Minimum (%REC)	Maximum (%REC)
SW-846 8270	207-08-9	Benzo(k)fluoranthene	66	72
SW-846 8270	65-85-0	Benzoic Acid	39	60
SW-846 8270	100-51-6	Benzyl Alcohol	73	75
SW-846 6010	7440-41-7	Beryllium	103	104
SW-846 8270	111-44-4	bis(2-Chloroethyl)ether	62	65
SW-846 8270	39638-32-9	bis(2-Chloroisopropyl)ether	65	88
SW-846 8270	117-81-7	bis(2-Ethylhexyl)phthalate	70	85
SW-846 8270	85-68-7	Butylbenzylphthalate	66	76
SW-846 6010	7440-43-9	Cadmium	90	103
SW-846 6010	7440-47-3	Chromium	96	101
SW-846 8270	218-01-9	Chrysene	61	67
SW-846 6010	7440-48-4	Cobalt	94	103
SW-846 6010	7440-50-8	Copper	95	96
SW-846 8270	84-74-2	Di-n-butylphthalate	64	76
SW-846 8270	117-84-0	Di-n-octylphthalate	67	79
SW-846 8270	53-70-3	Dibenz(a,h)anthracene	63	71
SW-846 8270	132-64-9	Dibenzofuran	68	76
SW-846 8270	84-66-2	Diethylphthalate	68	70
SW-846 8270	131-11-3	Dimethylphthalate	66	69
SW-846 8270	206-44-0	Fluoranthene	60	78
SW-846 8270	86-73-7	Fluorene	65	72
SW-846 8270	118-74-1	Hexachlorobenzene	63	78
SW-846 8270	87-68-3	Hexachlorobutadiene	67	69
SW-846 8270	77-47-4	Hexachlorocyclopentadiene	51	56
SW-846 8270	67-72-1	Hexachloroethane	68	79
SW-846 8270	193-39-5	Indeno(1,2,3-cd)pyrene	63	70
SW-846 6010	7439-89-6	Iron	97	104
SW-846 8270	78-59-1	Isophorone	66	74
SW-846 6010	7439-92-1	Lead	95	102
SW-846 6010	7439-93-2	Lithium	96	102
SW-846 6010	7439-96-5	Manganese	99	102
SW-846 6010	7439-97-6	Mercury	95	99
SW-846 6010	7439-98-7	Molybdenum	94	103
SW-846 8270	86-30-6	n-Nitrosodiphenylamine	74	77
SW-846 8270	621-64-7	n-Nitrosodipropylamine	68	75
SW-846 8270	91-20-3	Naphthalene	65	71
SW-846 6010	7440-02-0	Nickel	92	101
SW-846 8270	98-95-3	Nitrobenzene	70	75
SW-846 8270	87-86-5	Pentachlorophenol	47	53
SW-846 8270	108-95-2	Phenol	68	73
SW-846 8270	129-00-0	Pyrene	62	68
SW-846 6010	7782-49-2	Selenium	93	99

Test Method	CAS No.	Analyte	Minimum (%REC)	Maximum (%REC)
SW-846 6010	7440-22-4	Silver	96	97
SW-846 6010	7440-24-6	Strontium	99	100
SW-846 6010	7440-31-5	Tin	89	104
SW-846 6010	11-09-6	Uranium, Total	98	98
SW-846 6010	7440-62-2	Vanadium	96	101
SW-846 6010	7440-66-6	Zinc	98	106

Surrogate Evaluation

The minimum and maximum surrogate results are tabulated by chemical for the entire project in Table 9. Surrogates are added to every sample, and therefore surrogate recoveries only impact individual samples. Unacceptable surrogate recoveries can indicate potential matrix effects. Surrogate recoveries reported above 100 percent may indicate the actual sample results are less than reported. Because this is environmentally conservative, no further action is needed. Therefore, only the lowest recoveries were evaluated. If the maximum sample result divided by the lowest percent recovery is less than the WRW AL for that analyte, no further action is taken because any indicated bias is not great enough to correct a false low sample result to one above the WRW AL. The lowest surrogate recoveries and the associated sample results for this project were reviewed. The review indicated project decisions would not be impacted. Any qualifications of results due to surrogate results are captured in the V&V flags, described in Section 5.2.3.

Table 9
Surrogate Recovery Summary

Number of Samples	Surrogate	Minimum (%REC)	Maximum (%REC)
SVOC Surrogate Recoveries			
6	2-Fluorobiphenyl	52	79
6	2-Fluorophenol	55	80
6	Deuterated Nitrobenzene	54	87
6	p-Terphenyl-d14	41	61

Field Blank Evaluation

Results of the field blank analyses are given in Table 10. Detectable amounts of contaminants within the blanks, which could indicate possible cross-contamination of samples, are evaluated if the same contaminant is detected in the associated real samples. When the real result is less than 10 times the blank result for laboratory contaminants and 5 times the result for non-laboratory contaminants, the real result is eliminated. None of the chemicals were detected in the blanks at concentrations greater than one-tenth the WRW AL. Therefore, no sample results at or above the WRW AL could have been impacted by the blanks.

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Table 10
Field QA Summary

Laboratory	CAS No.	Analyte	Sample QC Code	Detected Value	Result Unit
URS	15117-96-1	Uranium-235	EB	0.137	pCi/g
URS	15117-96-1	Uranium-235	FB	0.127	pCi/g
URS	7440-61-1	Uranium-238	EB	1.99	pCi/g
URS	7440-61-1	Uranium-238	FB	2.5	pCi/g

Blanks (TB = trip blank, RNS = rinse blank, FB = field blank, EB = equipment blank) results greater than detection limits (not *U* qualified)

Sample Matrix Spike Evaluation

The minimum and maximum MS results are summarized by chemical for the entire project in Table 11. Organic analytes with unacceptable low recoveries resulted in a review of the LCS recoveries. According to the EPA data validation guidelines, if organic MS recoveries are low, then the LCS recovery is to be checked and, if acceptable, no action is to be taken. While 2,4-dinitrophenol, 3,3-dichlorobenzidine, 4,6-dinitro-2-methylphenol, 4-chloroaniline, and pentachlorophenol had low recoveries, these checks indicate no decisions were impacted for organic analytes, therefore no action was taken.

For inorganics, the associated sample results were divided by the lowest percent recovery for each analyte. If the resulting number was less than the WRW AL, decisions were not impacted, therefore no action was taken. For this project, iron, manganese, and zinc had low recoveries and were checked. For these analytes, the WRW AL was at least a factor of three times higher than the highest sample result, therefore no decisions were impacted.

Table 11
Sample MS Evaluation Summary

Test Method	CAS No.	Analyte	Minimum (%REC)	Maximum (%REC)	Number of Laboratory Samples	Number of Laboratory Batches
SW-846 8270	120-82-1	1,2,4-Trichlorobenzene	56.00	75.00	3	3
SW-846 8270	95-95-4	2,4,5-Trichlorophenol	61.00	82.00	3	3
SW-846 8270	88-06-2	2,4,6-Trichlorophenol	63.00	83.00	3	3
SW-846 8270	120-83-2	2,4-Dichlorophenol	63.00	84.00	3	3
SW-846 8270	105-67-9	2,4-Dimethylphenol	63.00	89.00	3	3
SW-846 8270	51-28-5	2,4-Dinitrophenol	18.00	85.00	3	3
SW-846 8270	121-14-2	2,4-Dinitrotoluene	64.00	89.00	3	3
SW-846 8270	606-20-2	2,6-Dinitrotoluene	65.00	90.00	3	3
SW-846 8270	91-58-7	2-Chloronaphthalene	61.00	76.00	3	3
SW-846 8270	95-57-8	2-Chlorophenol	60.00	79.00	3	3
SW-846 8270	91-57-6	2-Methylnaphthalene	61.00	85.00	3	3
SW-846 8270	95-48-7	2-Methylphenol	61.00	80.00	3	3

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Test Method	CAS No.	Analyte	Minimum (%REC)	Maximum (%REC)	Number of Laboratory Samples	Number of Laboratory Batches
SW-846 8270	88-74-4	2-Nitroaniline	66.00	97.00	3	3
SW-846 8270	91-94-1	3,3'-Dichlorobenzidine	26.00	78.00	3	3
SW-846 8270	534-52-1	4,6-Dinitro-2-methylphenol	27.00	82.00	3	3
SW-846 8270	106-47-8	4-Chloroaniline	41.00	63.00	3	3
SW-846 8270	106-44-5	4-Methylphenol	64.00	81.00	3	3
SW-846 8270	100-02-7	4-Nitrophenol	70.00	102.00	3	3
SW-846 8270	83-32-9	Acenaphthene	59.00	158.00	3	3
SW-846 6010	7429-90-5	Aluminum	51.00	51.00	1	1
SW-846 8270	120-12-7	Anthracene	61.00	408.00	3	3
SW-846 6010	7440-36-0	Antimony	76.00	76.00	1	1
SW-846 6010	7440-38-2	Arsenic	92.00	92.00	1	1
SW-846 6010	7440-39-3	Barium	96.00	96.00	1	1
SW-846 8270	56-55-3	Benzo(a)anthracene	61.00	84.00	2	2
SW-846 8270	50-32-8	Benzo(a)pyrene	60.00	83.00	2	2
SW-846 8270	205-99-2	Benzo(b)fluoranthene	60.00	81.00	2	2
SW-846 8270	207-08-9	Benzo(k)fluoranthene	59.00	81.00	2	2
SW-846 8270	65-85-0	Benzoic Acid	71.00	111.00	3	3
SW-846 8270	100-51-6	Benzyl Alcohol	64.00	77.00	3	3
SW-846 6010	7440-41-7	Beryllium	99.00	99.00	1	1
SW-846 8270	111-44-4	bis(2-Chloroethyl)ether	51.00	78.00	3	3
SW-846 8270	39638-32-9	bis(2-Chloroisopropyl)ether	54.00	101.00	3	3
SW-846 8270	117-81-7	bis(2-Ethylhexyl)phthalate	51.00	95.00	3	3
SW-846 8270	85-68-7	Butylbenzylphthalate	51.00	92.00	3	3
SW-846 6010	7440-43-9	Cadmium	90.00	90.00	1	1
SW-846 6010	7440-47-3	Chromium	83.00	83.00	1	1
SW-846 8270	218-01-9	Chrysene	58.00	83.00	2	2
SW-846 6010	7440-48-4	Cobalt	91.00	91.00	1	1
SW-846 6010	7440-50-8	Copper	77.00	77.00	1	1
SW-846 8270	84-74-2	Di-n-butylphthalate	64.00	94.00	3	3
SW-846 8270	117-84-0	Di-n-octylphthalate	57.00	87.00	3	3
SW-846 8270	53-70-3	Dibenz(a,h)anthracene	58.00	277.00	3	3
SW-846 8270	132-64-9	Dibenzofuran	62.00	123.00	3	3
SW-846 8270	84-66-2	Diethylphthalate	63.00	88.00	3	3
SW-846 8270	131-11-3	Dimethylphthalate	64.00	83.00	3	3
SW-846 8270	206-44-0	Fluoranthene	57.00	90.00	2	2
SW-846 8270	86-73-7	Fluorene	59.00	194.00	3	3
SW-846 8270	118-74-1	Hexachlorobenzene	55.00	84.00	3	3
SW-846 8270	87-68-3	Hexachlorobutadiene	57.00	74.00	3	3
SW-846 8270	77-47-4	Hexachlorocyclopentadiene	0.00	46.00	3	3
SW-846 8270	67-72-1	Hexachloroethane	53.00	79.00	3	3
SW-846 8270	193-39-5	Indeno(1,2,3-cd)pyrene	59.00	528.00	3	3

Test Method	CAS No.	Analyte	Minimum (%REC)	Maximum (%REC)	Number of Laboratory Samples	Number of Laboratory Batches
SW-846 6010	7439-89-6	Iron	0.00	0.00	1	1
SW-846 8270	78-59-1	Isophorone	60.00	87.00	3	3
SW-846 6010	7439-92-1	Lead	91.00	91.00	1	1
SW-846 6010	7439-93-2	Lithium	97.00	97.00	1	1
SW-846 6010	7439-96-5	Manganese	0.00	0.00	1	1
SW-846 6010	7439-97-6	Mercury	92.00	92.00	1	1
SW-846 6010	7439-98-7	Molybdenum	92.00	92.00	1	1
SW-846 8270	86-30-6	n-Nitrosodiphenylamine	66.00	91.00	3	3
SW-846 8270	621-64-7	n-Nitrosodipropylamine	58.00	84.00	3	3
SW-846 8270	91-20-3	Naphthalene	56.00	82.00	3	3
SW-846 6010	7440-02-0	Nickel	95.00	95.00	1	1
SW-846 8270	98-95-3	Nitrobenzene	57.00	86.00	3	3
SW-846 8270	87-86-5	Pentachlorophenol	44.00	77.00	3	3
SW-846 8270	108-95-2	Phenol	60.00	85.00	3	3
SW-846 8270	129-00-0	Pyrene	56.00	85.00	2	2
SW-846 6010	7782-49-2	Selenium	92.00	92.00	1	1
SW-846 6010	7440-22-4	Silver	93.00	93.00	1	1
SW-846 6010	7440-24-6	Strontium	97.00	97.00	1	1
SW-846 6010	7440-31-5	Tin	88.00	88.00	1	1
SW-846 6010	11-09-6	Uranium, Total	98.00	98.00	1	1
SW-846 6010	7440-62-2	Vanadium	90.00	90.00	1	1
SW-846 6010	7440-66-6	Zinc	0.00	0.00	1	1

5.2.2 Precision

Matrix Spike Duplicate Evaluation

Laboratory precision is measured through the use of MSDs which are summarized in Table 12. Analytes with the highest relative percent differences (RPDs) were reviewed by comparing the highest sample result to the WRW AL. If the highest samples were sufficiently below the WRW ALs, no further action is needed. For this project, the reviews indicated decisions were not impacted. While some RPDs appear to be high (4,6-dinitro-2-methylphenol, aluminum, and copper), they would not result in the rejection of data that affects project decisions.

Table 12
Sample MSD Evaluation Summary

Test Method	CAS No.	Analyte	Maximum RPD (%)
SW-846 8270	120-82-1	1,2,4-Trichlorobenzene	5.88
SW-846 8270	95-95-4	2,4,5-Trichlorophenol	12.17

Test Method	CAS No.	Analyte	Maximum RPD (%)
SW-846 8270	88-06-2	2,4,6-Trichlorophenol	10.00
SW-846 8270	120-83-2	2,4-Dichlorophenol	10.00
SW-846 8270	105-67-9	2,4-Dimethylphenol	10.65
SW-846 8270	51-28-5	2,4-Dinitrophenol	18.87
SW-846 8270	121-14-2	2,4-Dinitrotoluene	13.33
SW-846 8270	606-20-2	2,6-Dinitrotoluene	9.68
SW-846 8270	91-58-7	2-Chloronaphthalene	6.78
SW-846 8270	95-57-8	2-Chlorophenol	3.28
SW-846 8270	91-57-6	2-Methylnaphthalene	8.59
SW-846 8270	95-48-7	2-Methylphenol	7.79
SW-846 8270	88-74-4	2-Nitroaniline	9.52
SW-846 8270	91-94-1	3,3'-Dichlorobenzidine	3.92
SW-846 8270	534-52-1	4,6-Dinitro-2-methylphenol	45.45
SW-846 8270	106-47-8	4-Chloroaniline	10.26
SW-846 8270	106-44-5	4-Methylphenol	4.80
SW-846 8270	100-02-7	4-Nitrophenol	22.22
SW-846 8270	83-32-9	Acenaphthene	8.85
SW-846 6010	7429-90-5	Aluminum	185.12
SW-846 8270	120-12-7	Anthracene	10.34
SW-846 6010	7440-36-0	Antimony	8.22
SW-846 6010	7440-38-2	Arsenic	1.09
SW-846 6010	7440-39-3	Barium	7.04
SW-846 8270	56-55-3	Benzo(a)anthracene	4.88
SW-846 8270	50-32-8	Benzo(a)pyrene	2.44
SW-846 8270	205-99-2	Benzo(b)fluoranthene	1.68
SW-846 8270	207-08-9	Benzo(k)fluoranthene	5.22
SW-846 8270	65-85-0	Benzoic Acid	13.53
SW-846 8270	100-51-6	Benzyl Alcohol	2.70
SW-846 6010	7440-41-7	Beryllium	1.02
SW-846 8270	111-44-4	bis(2-Chloroethyl)ether	11.11
SW-846 8270	39638-32-9	bis(2-Chloroisopropyl)ether	8.85
SW-846 8270	117-81-7	bis(2-Ethylhexyl)phthalate	8.96
SW-846 8270	85-68-7	Butylbenzylphthalate	12.50
SW-846 6010	7440-43-9	Cadmium	1.10
SW-846 6010	7440-47-3	Chromium	14.53
SW-846 8270	218-01-9	Chrysene	7.50
SW-846 6010	7440-48-4	Cobalt	1.09
SW-846 6010	7440-50-8	Copper	49.76
SW-846 8270	84-74-2	Di-n-butylphthalate	9.84
SW-846 8270	117-84-0	Di-n-octylphthalate	11.76
SW-846 8270	53-70-3	Dibenz(a,h)anthracene	7.14
SW-846 8270	132-64-9	Dibenzofuran	10.17

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Test Method	CAS No.	Analyte	Maximum RPD (%)
SW-846 8270	84-66-2	Diethylphthalate	11.76
SW-846 8270	131-11-3	Dimethylphthalate	11.57
SW-846 8270	206-44-0	Fluoranthene	4.55
SW-846 8270	86-73-7	Fluorene	10.71
SW-846 8270	118-74-1	Hexachlorobenzene	8.85
SW-846 8270	87-68-3	Hexachlorobutadiene	8.45
SW-846 8270	77-47-4	Hexachlorocyclopentadiene	8.00
SW-846 8270	67-72-1	Hexachloroethane	12.08
SW-846 8270	193-39-5	Indeno(1,2,3-cd)pyrene	7.02
SW-846 8270	78-59-1	Isophorone	2.33
SW-846 6010	7439-92-1	Lead	4.30
SW-846 6010	7439-93-2	Lithium	0.00
SW-846 6010	7439-97-6	Mercury	2.20
SW-846 6010	7439-98-7	Molybdenum	1.09
SW-846 8270	86-30-6	n-Nitrosodiphenylamine	11.20
SW-846 8270	621-64-7	n-Nitrosodipropylamine	6.67
SW-846 8270	91-20-3	Naphthalene	5.00
SW-846 6010	7440-02-0	Nickel	4.30
SW-846 8270	98-95-3	Nitrobenzene	8.40
SW-846 8270	87-86-5	Pentachlorophenol	24.72
SW-846 8270	108-95-2	Phenol	3.59
SW-846 8270	129-00-0	Pyrene	10.17
SW-846 6010	7782-49-2	Selenium	1.08
SW-846 6010	7440-22-4	Silver	0.00
SW-846 6010	7440-24-6	Strontium	3.05
SW-846 6010	7440-31-5	Tin	2.30
SW-846 6010	11-09-6	Uranium, Total	1.03
SW-846 6010	7440-62-2	Vanadium	9.52

Field Duplicate Evaluation

Field duplicate results reflect sampling precision, or overall repeatability of the sampling process. The frequency of field duplicate collection should exceed 1 field duplicate per 20 real samples, or 5 percent. Table 13 indicates that sampling frequencies were adequate for all samples collected.

Table 13
Field Duplicate Sample Frequency Summary

Test Method	Sample Code	Number of Samples	% Duplicate Samples
ALPHA SPEC	REAL	2	100.00
	DUP	2	

Test Method	Sample Code	Number of Samples	% Duplicate Samples
GAMMA SPECTROSCOPY	REAL	8	25.00
	DUP	2	
SW-846 6010	REAL	6	33.33
	DUP	2	
SW-846 8270/8270B	REAL	6	33.33
	DUP	2	

RPDs indicate how much variation exists in the field duplicate analyses. The EPA data validation guidelines state that "there are no required review criteria for field duplicate analyses comparability." For the DQA, the highest maximum RPDs listed in Table 14 were reviewed. For IHSS Group 400-4, some SVOC RPD results were high. This is due in part to the dilution result reporting. The laboratory results for these samples reported the "real" sample at a different dilution than the "duplicate" sample result. This resulted in a higher RPD. Nevertheless, project decisions were not affected because the decision whether to remediate was also based on RFCA requirements.

Table 14
RPD Evaluation Summary

Laboratory	Analyte	Maximum of RPD (%)
ESTLDEN	1,2,4-Trichlorobenzene	5.99
ESTLDEN	2,4,5-Trichlorophenol	5.99
ESTLDEN	2,4,6-Trichlorophenol	5.99
ESTLDEN	2,4-Dichlorophenol	5.99
ESTLDEN	2,4-Dimethylphenol	5.99
ESTLDEN	2,4-Dinitrophenol	4.76
ESTLDEN	2-Chloronaphthalene	5.99
ESTLDEN	2-Chlorophenol	5.99
ESTLDEN	2-Methylnaphthalene	5.99
ESTLDEN	2-Methylphenol	5.99
ESTLDEN	2-Nitroaniline	4.76
ESTLDEN	3,3'-Dichlorobenzidine	6.06
ESTLDEN	4,6-Dinitro-2-methylphenol	4.76
ESTLDEN	4-Chloroaniline	6.06
ESTLDEN	4-Methylphenol	5.99
ESTLDEN	4-Nitrophenol	4.76
ESTLDEN	Acenaphthene	162.32
ESTLDEN	Aluminum	40.00
ESTLDEN	Anthracene	151.35
ESTLDEN	Barium	27.45
ESTLDEN	Benzo(a)anthracene	131.66
ESTLDEN	Benzo(a)pyrene	133.33
ESTLDEN	Benzo(b)fluoranthene	135.26
ESTLDEN	Benzo(k)fluoranthene	131.43

Laboratory	Analyte	Maximum of RPD (%)
ESTLDEN	Benzoic Acid	4.76
ESTLDEN	Benzyl Alcohol	6.06
ESTLDEN	Beryllium	2.53
ESTLDEN	bis(2-Chloroethyl)ether	5.99
ESTLDEN	bis(2-Chloroisopropyl)ether	5.99
ESTLDEN	bis(2-Ethylhexyl)phthalate	5.99
ESTLDEN	Butylbenzylphthalate	5.99
ESTLDEN	Chromium	25.71
ESTLDEN	Chrysene	134.11
ESTLDEN	Cobalt	15.38
ESTLDEN	Copper	44.90
ESTLDEN	Di-n-butylphthalate	5.99
ESTLDEN	Di-n-octylphthalate	5.99
ESTLDEN	Dibenz(a,h)anthracene	136.13
ESTLDEN	Dibenzofuran	5.99
ESTLDEN	Diethylphthalate	5.99
ESTLDEN	Dimethylphthalate	5.99
ESTLDEN	Fluoranthene	147.37
ESTLDEN	Fluorene	163.64
ESTLDEN	Hexachlorobenzene	5.99
ESTLDEN	Hexachlorobutadiene	5.99
ESTLDEN	Hexachlorocyclopentadiene	5.99
ESTLDEN	Hexachloroethane	5.99
ESTLDEN	Indeno(1,2,3-cd)pyrene	137.55
ESTLDEN	Iron	14.38
ESTLDEN	Isophorone	5.99
ESTLDEN	Lead	126.76
ESTLDEN	Lithium	25.56
ESTLDEN	Manganese	23.35
ESTLDEN	n-Nitrosodiphenylamine	5.99
ESTLDEN	n-Nitrosodipropylamine	5.99
ESTLDEN	Naphthalene	5.99
ESTLDEN	Nickel	29.09
ESTLDEN	Nitrobenzene	5.99
ESTLDEN	Pentachlorophenol	4.76
ESTLDEN	Phenol	5.99
ESTLDEN	Pyrene	139.24
ESTLDEN	Strontium	48.80
ESTLDEN	Tin	16.22
ESTLDEN	Vanadium	28.57
ESTLDEN	Zinc	44.16

5.2.3 Completeness

Based on original project DQOs, a minimum of 25 percent of Environmental Restoration (ER) Program analytical (and radiological) results must be formally verified and validated. Of that percentage, no more than 10 percent of the results may be rejected, which ensures that analytical laboratory practices are consistent with quality requirements. Table 15 shows the number and percentage of validated records (codes without "1"), the number and percentage of verified records (codes with "1"), and the percentage of rejected records for each analyte group. The summary of verified and validated records indicates that the data is acceptable.

Table 15
Validation and Verification Summary

Validation Qualifier Code	Total of CAS Number	Alpha Spec	Gamma Spectroscopy	SW-846 6010	SW-846 8270
J	23	0	0	23	0
J1	12	0	0	12	0
UJ	5	0	0	5	0
UJ1	7	0	0	7	0
V	208	5	9	38	156
V1	226	5	15	50	156
Total	481	10	24	135	312
Validated	236	5	9	66	156
% Validated	49.06%	50.00%	37.50%	48.89%	50.00%
Verified	245	5	15	69	156
% Verified	50.94%	50.00%	62.50%	51.11%	50.00%

Validated - J, V, JB, UJ
Verified - 1, J1, V1, B1, UJ1

5.2.4 Sensitivity

RLs, in units of ug/kg for organics, milligrams per kilogram (mg/kg) for metals, and picocuries per gram (pCi/g) for radionuclides, were compared with RFCA WRW ALs. Adequate sensitivities of analytical methods were attained for all COCs that affect project decisions. "Adequate" sensitivity is defined as an RL less than an analyte's associated AL, typically less than one-half the AL.

5.3 Summary of Data Quality

RPDs greater than 35 percent indicate the sampling precision limits of some analytes have been exceeded. No records were rejected. Only 15 percent of the SW-846 6010 records were validated. If additional V&V information is received, IHSS Group 400-4 records will be updated in SWD. Data qualified as a result of additional data will be assessed as part of the CRA process. Data collected and used for IHSS Group 400-4 are adequate for decision making based on ER Program goals.

6.0 REFERENCES

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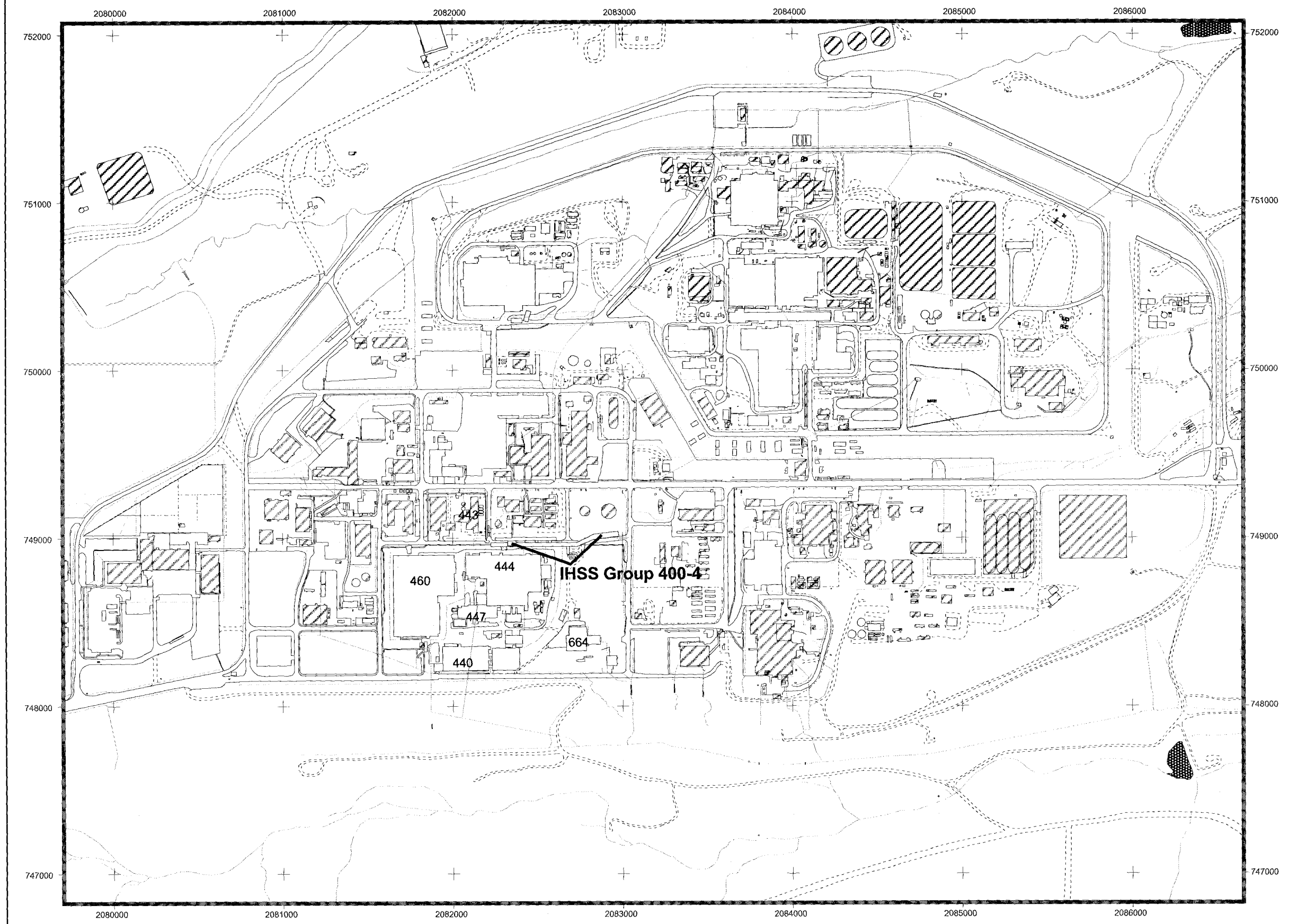
Figure 1
IHSS Group 400-4
Location Map



KEY

- PAC
- Dirt Road
- Paved Road
- Stream
- Lake
- Fence

Structure
- Demolished
- Standing

N
W E
S

400 0 400 Feet

Scale = 1:7,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: Date: August 2004

RADMS

Prepared for:

KAISER•HILL COMPANY

File: File: w:\projects\fy2004\400-4\Data_Summary\AV_Projects\400-4-dsr_072904.ap

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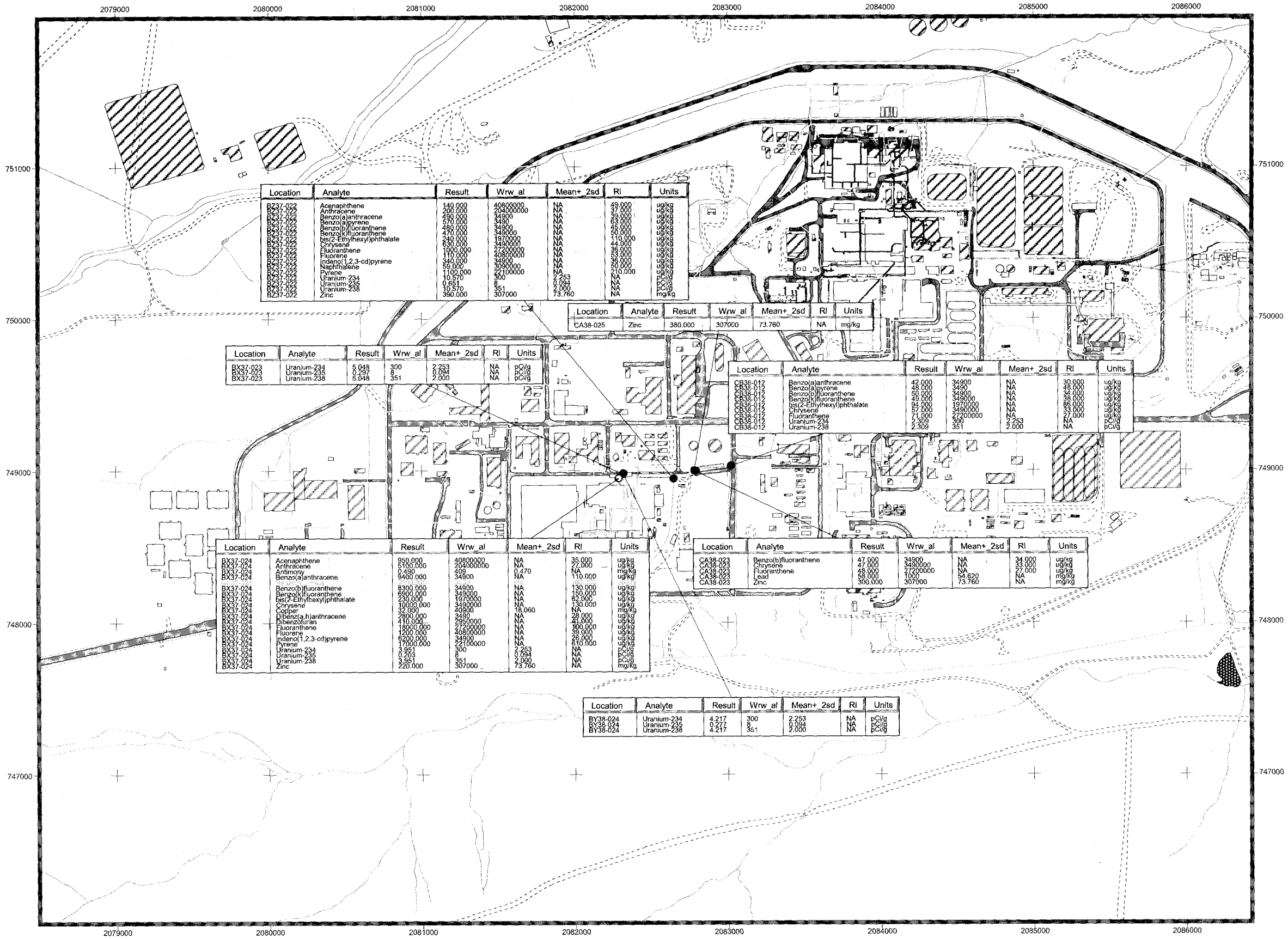

Location	Analyte	Result	Wrw_al	Mean+ 2sd	RI	Units
BZ37-022	Acenaphthene	140.000	40800000	NA	49.000	ug/kg
BZ37-022	Anthracene	200.000	204000000	NA	37.000	ug/kg
BZ37-022	Benzo(a)anthracene	490.000	34900	NA	39.000	ug/kg
BZ37-022	Benzo(a)pyrene	570.000	3490	NA	63.000	ug/kg
BZ37-022	Benzo(b)fluoranthene	480.000	34900	NA	45.000	ug/kg
BZ37-022	Benzo(k)fluoranthene	470.000	349000	NA	50.000	ug/kg
BZ37-022	bis(2-Ethylhexyl)phthalate	240.000	1970000	NA	110.000	ug/kg
BZ37-022	Chrysene	630.000	3490000	NA	44.000	ug/kg
BZ37-022	Fluoranthene	1000.000	27200000	NA	35.000	ug/kg
BZ37-022	Fluorene	110.000	4080000	NA	53.000	ug/kg
BZ37-022	Indeno(1,2,3-cd)pyrene	340.000	34900	NA	35.000	ug/kg
BZ37-022	Naphthalene	59.000	295000	NA	52.000	ug/kg
BZ37-022	Pyrene	1100.000	2270000	NA	210.000	ug/kg
BZ37-022	Uranium-234	10.570	300	2.253	NA	pCi/g
BZ37-022	Uranium-235	0.651	8	0.094	NA	pCi/g
BZ37-022	Uranium-238	10.570	351	2.000	NA	pCi/g
BZ37-022	Zinc	390.000	307000	73.760	NA	mg/kg

Location	Analyte	Result	Wrw_al	Mean+ 2sd	RI	Units
CA38-025	Zinc	380.000	307000	73.760	NA	mg/kg

Location	Analyte	Result	Wrw_al	Mean+ 2sd	RI	Units
BX37-023	Uranium-234	5.048	300	2.253	NA	pCi/g
BX37-023	Uranium-235	0.297	8	0.094	NA	pCi/g
BX37-023	Uranium-238	5.048	351	2.000	NA	pCi/g

Location	Analyte	Result	Wrw_al	Mean+ 2sd	RI	Units
CB38-012	Benzo(a)anthracene	42.000	34900	NA	30.000	ug/kg
CB38-012	Benzo(a)pyrene	48.000	3490	NA	46.000	ug/kg
CB38-012	Benzo(b)fluoranthene	50.000	34900	NA	36.000	ug/kg
CB38-012	Benzo(k)fluoranthene	49.000	349000	NA	39.000	ug/kg
CB38-012	bis(2-Ethylhexyl)phthalate	94.000	1970000	NA	86.000	ug/kg
CB38-012	Chrysene	57.000	3490000	NA	33.000	ug/kg
CB38-012	Fluoranthene	71.000	27200000	NA	27.000	ug/kg
CB38-012	Uranium-234	2.309	300	2.253	NA	pCi/g
CB38-012	Uranium-238	2.309	351	2.000	NA	pCi/g

Location	Analyte	Result	Wrw_al	Mean+ 2sd	RI	Units
BX37-024	Acenaphthene	950.000	40800000	NA	35.000	ug/kg
BX37-024	Anthracene	5100.000	204000000	NA	27.000	ug/kg
BX37-024	Antimony	0.490	408	0.470	NA	mg/kg
BX37-024	Benzo(a)anthracene	9400.000	34900	NA	110.000	ug/kg
BX37-024	Benzo(b)fluoranthene	8300.000	34900	NA	130.000	ug/kg
BX37-024	Benzo(k)fluoranthene	6900.000	349000	NA	150.000	ug/kg
BX37-024	bis(2-Ethylhexyl)phthalate	230.000	1970000	NA	82.000	ug/kg
BX37-024	Chrysene	10000.000	3490000	NA	130.000	ug/kg
BX37-024	Copper	32.900	40800	18.060	NA	mg/kg
BX37-024	Dibenz(a,h)anthracene	2800.000	3490	NA	28.000	ug/kg
BX37-024	Dibenzofuran	410.000	29500	NA	40.000	ug/kg
BX37-024	Fluoranthene	18000.000	27200000	NA	100.000	ug/kg
BX37-024	Fluorene	1200.000	4080000	NA	39.000	ug/kg
BX37-024	Indeno(1,2,3-cd)pyrene	6200.000	34900	NA	26.000	ug/kg
BX37-024	Pyrene	17000.000	2270000	NA	610.000	ug/kg
BX37-024	Uranium-234	3.951	300	2.253	NA	pCi/g
BX37-024	Uranium-235	0.203	8	0.094	NA	pCi/g
BX37-024	Uranium-238	3.951	351	2.000	NA	pCi/g
BX37-024	Zinc	220.000	307000	73.760	NA	mg/kg

Location	Analyte	Result	Wrw_al	Mean+ 2sd	RI	Units
CA38-023	Benzo(b)fluoranthene	47.000	34900	NA	34.000	ug/kg
CA38-023	Chrysene	47.000	3490000	NA	33.000	ug/kg
CA38-023	Fluoranthene	48.000	27200000	NA	27.000	ug/kg
CA38-023	Lead	58.000	1000	54.620	NA	mg/kg
CA38-023	Zinc	366.000	307000	73.760	NA	mg/kg

Location	Analyte	Result	Wrw_al	Mean+ 2sd	RI	Units
BY38-024	Uranium-234	4.217	300	2.253	NA	pCi/g
BY38-024	Uranium-235	0.277	8	0.094	NA	pCi/g
BY38-024	Uranium-238	4.217	351	2.000	NA	pCi/g

Figure 2
HSS Group 400-4 Surface Soil Results Greater Than Background Means Plus Two Standard Deviations or Reporting Limits

KEY

Sampling Location
- Exceeds WRW Action Level
- Exceeds Background or RL

PAC 400-803
PAC 400-804
OPWL
Dirt Road
Stream
Storm Drain

Structure
Demolished
Standing
UBC

Paved Road
Asphalt

N
W E
S

200 0 200 400 600 800 1000 Feet

Scale = 1:8,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: RADMS Date: August 2004

Prepared for: KAISER•HILL COMPANY

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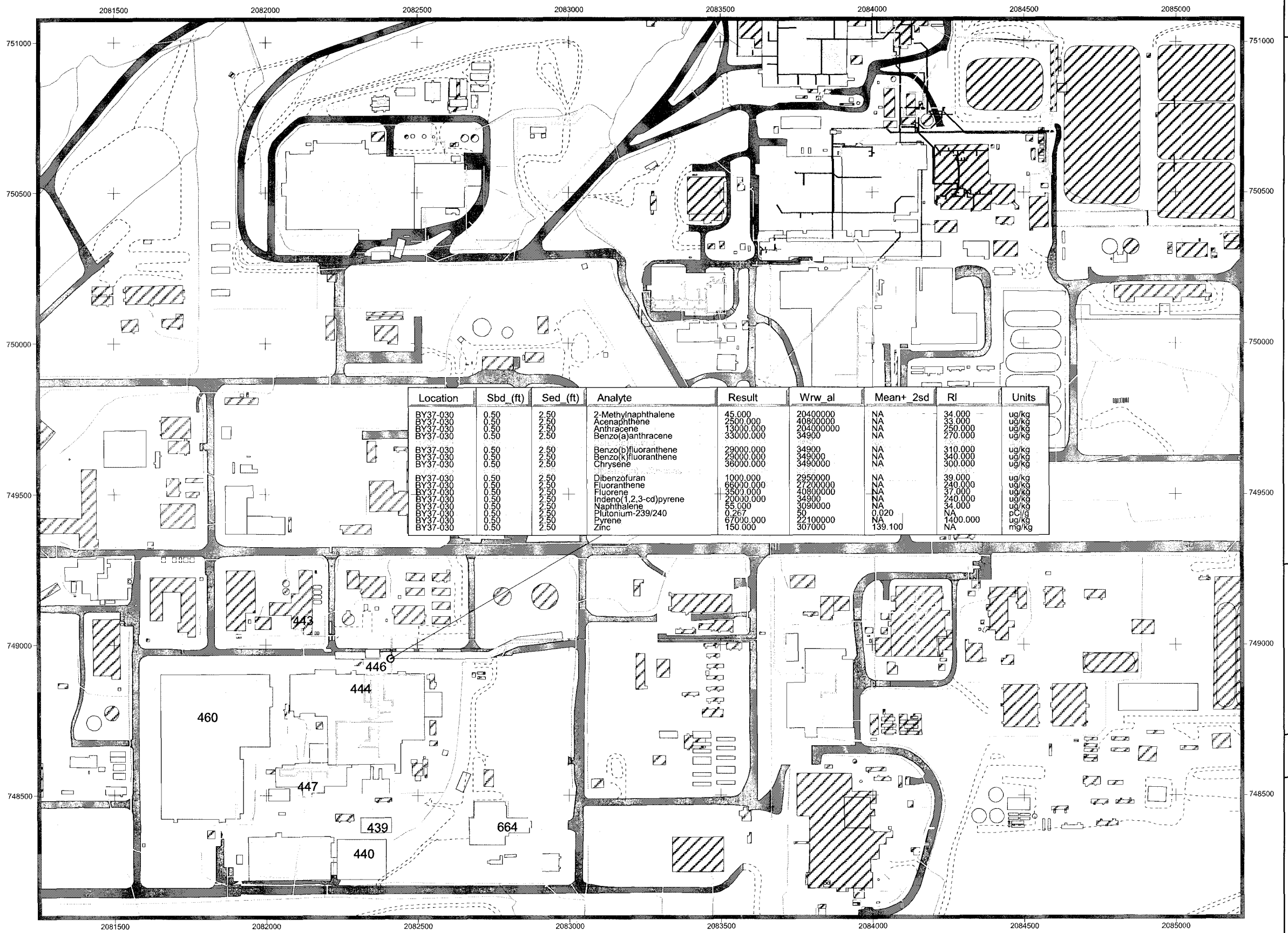

Location	Sbd_(ft)	Sed_(ft)	Analyte	Result	Wrw_al	Mean+ 2sd	Rl	Units
BY37-030	0.50	2.50	2-Methylnaphthalene	45.000	20400000	NA	34.000	ug/kg
BY37-030	0.50	2.50	Acenaphthene	2500.000	40800000	NA	33.000	ug/kg
BY37-030	0.50	2.50	Anthracene	13000.000	204000000	NA	250.000	ug/kg
BY37-030	0.50	2.50	Benzo(a)anthracene	33000.000	34900	NA	270.000	ug/kg
BY37-030	0.50	2.50	Benzo(b)fluoranthene	29000.000	34900	NA	310.000	ug/kg
BY37-030	0.50	2.50	Benzo(k)fluoranthene	29000.000	349000	NA	340.000	ug/kg
BY37-030	0.50	2.50	Chrysene	36000.000	3490000	NA	300.000	ug/kg
BY37-030	0.50	2.50	Dibenzofuran	1000.000	2950000	NA	39.000	ug/kg
BY37-030	0.50	2.50	Fluoranthene	66000.000	27200000	NA	240.000	ug/kg
BY37-030	0.50	2.50	Fluorene	3500.000	40800000	NA	37.000	ug/kg
BY37-030	0.50	2.50	Indeno(1,2,3-cd)pyrene	20000.000	34900	NA	240.000	ug/kg
BY37-030	0.50	2.50	Naphthalene	55.000	3090000	NA	34.000	ug/kg
BY37-030	0.50	2.50	Plutonium-239/240	0.267	50	0.020	NA	pCi/g
BY37-030	0.50	2.50	Pyrene	67000.000	22100000	NA	1400.000	ug/kg
BY37-030	0.50	2.50	Zinc	150.000	307000	139.100	NA	mg/kg

Figure 3
IHSS Group 400-4 Subsurface Soil Results Greater Than Background Means Plus Two Standard Deviations or Reporting Limits

KEY

Sampling Location
- Exceeds WRW Action Level
- Exceeds Background or RL

PAC 400-803
PAC 400-804
OPWL
Dirt Road
Stream
Storm Drain

Structure
- Demolished
- Standing

UBC

Paved Road
- Asphalt

N
W E
S

200 0 200 400 Feet

Scale = 1:4,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: RADMS Date: August 2004

Prepared for: KAISER•HILL COMPANY

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